Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Promoting Interoperability in the 700 MHz Commercial Spectrum	)	WT Docket No. 12-69
	)	

COMMENTS OF VULCAN WIRELESS LLC

Michele C. Farquhar
Christopher J. Termini

Hogan Lovells US LLP
555 Thirteenth Street, NW
Washington, DC 20004
Tel: (202) 637-5663
Fax: (202) 637-5910

Attorneys for Vulcan Wireless LLC

June 1, 2012

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EXECUTIVE SUMMARY

Vulcan Wireless applauds the Commission for commencing this proceeding to address the substantial public interest harms caused by the unprecedented and unjustifiable lack of interoperability in the Lower 700 MHz band. The Commission should seize this opportunity to fix the unwarranted change in the technical standards after Auction 73 by adopting an interoperability solution that reconsolidates the Lower A, B, and C Blocks and restores the unified band class and technical standards that applied to these paired spectrum blocks prior to Auction 73. After years of pursuing marketplace and regulatory solutions to the obstacles posed by non-interoperability, the Lower A Block licensees need certainty as they face initial deployment deadlines in just one year. The Commission should ensure that this proceeding yields a prompt, long-term solution that will help Lower A Block licensees obtain lower cost devices and equipment that meet consumer demands, enter into nationwide voice and data roaming arrangements, and deploy next-generation mobile service in their licensed areas. By reconsolidating the A, B, and C Blocks to enable use of common devices and infrastructure, the Commission can achieve these ends, in furtherance of the public interest.

An interoperability requirement could be implemented quickly and at minimal cost to consumers, Lower 700 MHz licensees, and device makers. Vulcan urges the Commission to adopt a decision in this proceeding before the end of 2012 to require a staged transition to a full interoperability mandate within 18 months of the decision. A prompt resolution to this proceeding would not only restore the certainty that A Block licensees had prior to Auction 73, but would help alleviate the spectrum crunch caused by the unprecedented demand for mobile services and abate the substantial economic harm that has resulted from non-interoperability in the Lower 700 MHz band. Prompt action will also preserve the many options available to effectuate an interoperability requirement. Much of the transition to an interoperable Lower 700 MHz band can

be accomplished through remote software upgrades, without any service disruption, delays, or degradation.

To facilitate the implementation of an interoperability mandate, the Commission should establish a reasonable, yet firm, transition timeline that would require Lower 700 MHz interoperability through interim milestones, with a full transition to occur no later than 18 months after the Commission's decision to adopt such a rule. Given the rapidly approaching coverage and service deadlines that A Block licensees must meet, the Commission's proposed two year transition period is inadequate. Accordingly, the Commission should adopt the following implementation timeline:

Months After Interoperability Decision	Milestone
6 months	***Base Station Transition*** – All carriers must upgrade their base stations to support interoperability across the entire Lower 700 MHz band.
9 months	***Interim Device Transition*** – Any carrier that offers at least one mobile device that is capable of operating on any paired spectrum block within the Lower 700 MHz band must commercially offer and support, in each market in which the carrier offers service to any person or entity, at least one mobile device that is capable of operating across all paired spectrum blocks in the Lower 700 MHz band.
18 months	***Full Transition*** – All carriers must ensure that each device that is capable of operating in any paired spectrum block within the Lower 700 MHz band, which the carrier offers to any person or entity in any market, is capable of operating across all paired spectrum blocks in the Lower 700 MHz band.

The persistent lack of interoperability in the Lower 700 MHz band since the close of Auction 73 has significantly impacted the availability and cost of equipment and devices to A Block licensees. The obvious limitations of the few Band Class 12 devices that have emerged in the marketplace only underscore the insurmountable obstacles that were created when the Lower 700 MHz band technical standards were fragmented after Auction 73. Without readily available equipment that works across the Lower 700 MHz band, Lower A Block licensees cannot

attract potential retail or wholesale customers or provide commercially viable service on their Lower A Block spectrum. This result has undermined the public interest by impeding the widespread deployment of Lower A Block spectrum, limiting the roaming options available to consumers, and thwarting the proliferation of competitive wireless service, including in rural and unserved areas where the need for wireless competition is most dire. Additionally, the unnecessary existence of a second Lower 700 MHz band class, making roaming "technically infeasible," has enabled some carriers to circumvent the FCC's roaming-related obligations. The consequences of a non-interoperable Lower 700 MHz band have been especially detrimental to greenfield licensees, such as Vulcan, which have no existing devices, infrastructure, vendor relationships, or other spectrum resources to leverage.

In light of the severity of these public interest harms, there is general agreement that Lower 700 MHz interoperability will yield substantial public interest benefits. For these reasons, the Commission has historically promoted interoperability across mobile broadband ecosystems. Yet despite repeated attempts by A Block licensees to address the interoperability problem in the marketplace, no industry solutions have emerged that will enable competitive Lower A Block service deployment within a reasonable time frame.

Reconsolidating the Lower A, B, and C Block is especially appropriate in light of the inequitable and unjustifiable manner in which Band Class 17 was established after Auction 73. Although the Commission and industry participants hoped that the licensing of Lower 700 MHz spectrum would lead to the proliferation of competitive 4G mobile broadband service, the post-auction segregation of the A Block from the B and C Blocks has severely hindered the deployment of commercial service in the Lower 700 MHz A Block. The unprecedented decision to fragment the Lower 700 MHz band into multiple band classes resulted from the undue influence of AT&T—the primary purchaser of Lower 700 MHz B and C Block devices, together with its

equipment suppliers, Motorola and Qualcomm—on the standards setting body, 3rd Generation Partnership Project. By exerting its excessive market power and voicing exaggerated concerns about the potential for Channel 51, D Block, and E Block transmissions to Lower B and C Block device reception, AT&T successfully convinced 3GPP to create a new Band Class 17 post-auction.

AT&T was not justified in advocating for the bifurcation of the Lower 700 MHz standards, and has never submitted any empirical or technical data to 3GPP or the FCC to justify the questionable assumptions and conclusions that yielded the creation of Band Class 12. Rather, extensive evidence demonstrates that interoperability in the Lower 700 MHz band will not cause harmful interference to Lower B or C Block device reception. Lab and field tests conducted within the last year, together with other factors, demonstrate that none of the justifications that have been offered to support the creation of Band Class 17 are valid:

- **Alleged Channel 51 Interference.** Although AT&T initially argued that the potential for Channel 51 interference was a key justification for the need to create Band Class 17, the final 3GPP device specifications adopted for Band Class 17 are identical to those of Band Class 12. As both band classes treat Channel 51 transmissions the same way, the use of any other component in a Band Class 17 device to address potential interference concerns could be utilized to the same effect if employed in Band Class 12 devices. But even if the Band Class 17 and Band Class 12 device specifications were different, technical studies have revealed that Channel 51 operations, even at excessive levels, will not cause reverse power amplifier intermodulation interference to Lower B and C Block device reception.

- **Alleged Lower D Block Interference.** The potential for Lower D Block transmissions to cause harmful interference to Lower B and C Block device reception is also invalid because the device specifications for Band Class 12 and Band Class 17 are identical with respect to the Lower D Block. Consequently, both band classes treat Lower D Block transmissions in the same way. Further mitigating this risk of interference is the fact that AT&T now holds all of the licenses to the Lower D Block spectrum. The FCC-imposed conditions on the transmission levels in the Lower D Block were imposed in part to manage the risk of harmful interference to Lower A, B, and C Block base station reception (although such conditions were *not* imposed to address device interference).

- **Alleged Lower E Block Interference.** The risk that high powered E Block transmissions may cause harmful blocking interference to Lower B and C Block device reception lacks merit. Field and lab tests conclusively demonstrated that Band Class 12 devices adequately protect Lower B and C Block users from high power E Block transmissions. Tests also confirmed that commercially available LTE devices are capable of receiving and managing neighboring signal levels far greater than that which might result from a unified Lower 700 MHz band class. The risk of E Block interference to Lower B and C Block device reception is further mitigated because AT&T holds the Lower E Block licenses in five major U.S. markets, covering a population of approximately 22% of the United States (70 million people). The FCC-imposed power limitations applicable to those licenses eliminate the possibility of interference to Lower B and C Block device reception in those markets.

AT&T's unusual ability to convince 3GPP to divorce the A Block from the Lower B and C Block after Auction 73, based on meritless justifications, was in part a product of the unique circumstances specific to the Lower 700 MHz band in the United States. The Commission was the first regulatory body in the world to re-allocate the 700 MHz Band from the traditional television service to mobile services, so that most 3GPP attendees did not have an interest in the Band Class 17 deliberations, saw no reason to contribute or object to what they saw as a U.S.-specific project, and had no reason to predict that the U.S. licensing regime would enable one party to exert undue influence over the 3GPP technical standards. Likewise, the Commission could not have anticipated how AT&T would exploit its undue market power to promote a fragmented band plan that has no theoretical or practical value, but rather serves to inhibit competition and circumvent FCC policies. The comparatively small and relatively nascent Lower A Block licensees, many of which were still awaiting license grants from the FCC when the 3GPP deliberations for Band Class 17 began, were not members of the 3GPP standards setting process, and would not need to become participants under normal circumstances. Consequently, AT&T was empowered to drive the standards-setting process for the spectrum bands in which it was the dominant license holder.

The lack of adoption of the U.S. 700 MHz band plan by other countries means a Band Class 12 ecosystem is not likely to develop absent an interoperability requirement. For example, the new band plan recently adopted in the Asia/Pacific region utilizing two 45 MHz blocks of spectrum for LTE FDD service is incompatible with the U.S. 700 MHz bands. To date, the only other country planning to follow the U.S. 700 MHz band plan is Canada. As operators generally benefit when a large number of countries employ the same band class to maximize the addressable market for devices, the ecosystem challenge for Band Class 12 will amplify if other countries continue to adopt band plans that are inconsistent with the U.S band plan.

Although Channel 51 and E Block transmissions continue to be problematic for A Block licensees' base station deployment, these transmissions will have no bearing on device reception or Lower B and C Block interference issues raised in this proceeding, and pose no threat to interoperability in the Lower 700 MHz band. Accordingly, the Commission can adopt an interoperability mandate in this proceeding and reconsolidate the paired spectrum in the Lower 700 MHz band without resolving the A Block base station interference concerns.

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I. INTRODUCTION

Vulcan Wireless LLC ("Vulcan"), through its attorneys, submits these comments in response to the Notice of Proposed Rulemaking ("NPRM") issued by the Federal Communications Commission ("FCC" or "Commission") in the above captioned proceeding.[1] The Commission has initiated this rulemaking to address the substantial public interest harms caused by the unprecedented and unjustifiable lack of interoperability in the Lower 700 MHz band that have impeded the deployment of commercially viable service in the Lower 700 MHz A Block. In striving to "promote interoperability in the Lower 700 MHz band and to encourage the efficient use of spectrum,"[2] the Commission seeks comment on whether customers receiving service from Lower 700 MHz B and C Block licensees would experience harmful interference if the Lower 700 MHz band were interoperable.[3] Additionally, the Commission seeks comment on what steps it should take upon finding that interoperability would "cause limited or no harmful interference to Lower 700 MHz B and C Block licensees, or that such interference can reasonably be mitigated

[1] Promoting Interoperability in the 700 MHz Commercial Spectrum, *Notice of Proposed Rulemaking*, WT Docket No. 12-69, FCC 12-31 (rel. Mar. 21, 2012) ("*NPRM*").

[2] *Id.* ¶ 5.

[3] *Id.*

through industry efforts and/or through modifications to the Commission's technical rules or other regulatory measures."[4]

For the reasons set forth more fully below, the Commission should adopt an interoperability requirement and reconsolidate the Lower 700 MHz band as soon as possible. The unprecedented and unjustifiable lack of interoperability in the Lower 700 MHz band has impeded the deployment of commercially viable service in the Lower 700 MHz A Block and has caused other substantial harm to A Block licensees. In addition, engineering analyses have demonstrated that a re-unified band class in the Lower 700 MHz band will pose no risk of harmful interference to Lower B and C Block device reception. By contrast, the existence of multiple standards for the Lower 700 MHz band—as a result of self-serving conduct by incumbent carriers—has stifled competition, stranded billions of dollars in investment, and resulted in the inefficient use of spectrum that is ideally suited for mobile broadband service, contrary to the public interest. As these costs and harms will compound with time, the Commission should focus on the Lower 700 MHz band in this proceeding and adopt an interoperability mandate by the end of 2012 that can be implemented quickly and at minimal cost.

II. BACKGROUND: THE MISGUIDED AND UNPRECEDENTED CREATION OF A NON-INTEROPERABLE LOWER 700 MHZ BAND AFTER THE COMPLETION OF AUCTION 73

The record before the Commission already reflects how AT&T exploited the FCC's 700 MHz licensing regime and controlled the 3GPP standards setting process to achieve the unprecedented development of a non-interoperable Lower 700 MHz band.[5] As the NPRM notes,

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[4] *Id.*

[5] *Id.* ¶ 10; *see, e.g.*, 700 MHz Block A Good Faith Purchaser Alliance Petition for Rulemaking Regarding the Need for 700 MHz Mobile Equipment to be Capable of Operating on All Paired Commercial 700 MHz Frequency Blocks (filed Sept. 29, 2009) ("*Good Faith Alliance Petition*"); Ex Parte Letter from Michele Farquhar, Hogan Lovells, Counsel to Vulcan Wireless, to Marlene Dortch, Secretary, Federal Communications Commission (Dec. 14, 2011), Attachment at 4 ("*Dec. 14 Vulcan Ex Parte*").

the Lower 700 MHz band "is the only non-interoperable commercial mobile service band,"[6] and there remains "disagreement over the rationale" for the establishment of Band Class 12 and Band Class 17, as well as "the wisdom of maintaining both."[7]

The historic decision to disaggregate the Lower 700 MHz band into multiple band classes after the FCC's 700 MHz auction resulted from the undue influence of AT&T—the primary purchaser of Lower 700 MHz B and C Block devices, together with its equipment suppliers, Motorola and Qualcomm—on the 3rd Generation Partnership Project ("3GPP").[8] In November 2007, prior to the commencement of Auction 73, 3GPP introduced Band Class 12 for the Lower 700 MHz band, comprised of the Lower A, B, and C Blocks.[9] At this time, AT&T and its key vendors, such as Motorola, offered no indication that it might devise another band class—largely duplicative with Band Class 12—that would include only the Lower B and C Blocks, thereby orphaning the Lower A Block. Likewise, in view of 3GPP's longstanding precedent of establishing a unified band class for each wireless spectrum band, no prospective bidder could have reasonably anticipated that 3GPP would disaggregate the Lower 700 MHz band. Consequently, at that time, entities planning to bid on Lower A Block licenses reasonably expected that the creation of Band Class 12 would result in mobile devices and equipment capable

[6] *NPRM* ¶ 2.

[7] *Id.* ¶ 3. As noted below, even Ericsson, a leading 4G equipment vendor, expressed reservations about the creation of multiple band classes within the Lower 700 MHz band.

[8] As noted in the NPRM, 3GPP is an independent, "consensus-driven international partnership of industry-based telecommunications standards bodies" that is principally responsible for establishing the technical standards for mobile broadband devices and equipment. *Id.* ¶ 10. 3GPP "is not associated with any governmental agency." *Id.; see also* 3GPP – About 3GPP, *at* http://www.3gpp.org/About-3GPP.

[9] *See* 3GPP TR 25.822, v1.0.0, 3rd Generation Partnership Project; Technical Specification Group TSG RAN; UMTS 700 MHz Work Item Technical Report (Release 8) (dated Nov. 2007), at 14 (Sec. 6.1).

of operating on all paired spectrum blocks in the Lower 700 MHz band, and in sufficient quantities that would help ensure the commercial and competitive viability of the A Block.[10]

The speed with which Band Class 17 was introduced is notable. Within seven weeks after the completion of Auction 73 in March 2008—when AT&T became the largest holder of Lower B and C Block spectrum and strategically did not purchase any A Block licenses—a new process was initiated within 3GPP to institute a band class that divorced the A Block from the B and C Blocks.[11] In May 2008, Motorola, one of AT&T's largest suppliers, first proposed a new band class that would be limited to the Lower B and C Blocks, ostensibly motivated by the need to address "co-existence issues" with high powered broadcast transmissions in Channel 51 and the Lower D and E Blocks.[12] Recognizing the potential costs of non-interoperability, Ericsson expressed reservations that detaching the A Block from the B and C Blocks would "go[] against economies of scale and may lead to market fragmentation," and explained that Motorola's apparent interference concerns were very manageable.[13]

In June 2008, AT&T responded to 3GPP by submitting several technically overstated assertions regarding the potential for Channel 51, D Block, and E Block transmissions to result in harmful interference to Lower B and C Block device reception, and clarified its desire for a

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[10] *See* Reply Comments of 700 MHz Block A Good Faith Purchasers Alliance, *700 MHz Mobile Equipment Capability; Petition for Rulemaking Regarding the Need for 700 MHz Mobile Equipment to be Capable of Operating on All Paired Commercial 700 MHz Frequency Bands*, RM-11592, at 44 (filed Apr. 30, 2010) ("*Good Faith Alliance Reply Comments*").

[11] *Dec. 14 Vulcan Ex Parte*, Attachment at 4.

[12] *See* Motorola, TS 36.101: Lower 700 MHz Band 15, 3GPP TSG RAN WG4 (Radio) Meeting #47, Kansas City, May 5-9, 2008 ("*Motorola Contribution*").

[13] Ericsson, On the Introduction of Band 15, TSG RAN Working Group 4 (Radio) Meeting #47bis, Munich, Germany, June 16-20, 2008 ("*Ericsson Contribution*"). Ericsson's objection to Band Class 17 as unnecessary and potentially anti-competitive has been affirmed by the recent lab and field studies, described below, that conclusively demonstrate that Channel 51 and high powered E Block broadcast transmissions do not cause harmful interference to Lower B and C Block operations, and that there are no significant interference-related impediments to interoperability in the Lower 700 MHz band. *See supra*, Section III.

separate band class designed exclusively for those spectrum blocks.[14] At that time, most Lower A Block licensees were still awaiting their license grants from the Commission. For example, Vulcan did not receive its Lower A Block license grants until June 26, 2008.[15] Similarly, Cavalier Wireless,[16] C Spire,[17] and MetroPCS[18] all received Lower A Block license grants on June 26, 2008—after AT&T endorsed Band Class 17 in 3GPP deliberations. By August 2008, when AT&T requested and received approval to form Band Class 17,[19] the smaller A Block licensees were just beginning to explore LTE and how to become involved in the 3GPP process. Moreover, some of the more experienced Lower A Block licensees, such as U.S. Cellular, were traditionally CDMA operators employing technologies standardized through 3GPP2, an entirely separate standards organization from 3GPP.[20] Such operators had no previous reason to be active in 3GPP because they did not employ technology standardized by 3GPP.

Technical analyses have confirmed that AT&T was never justified in establishing Band Class 17.[21] As detailed in the next Section, the new Band Class 17 does not treat Channel 51 transmissions differently than Band Class 12, which undermines AT&T's consistent claim that such transmissions pose an interference threat and justify the need for Band Class 17. As noted below, AT&T's abrupt change of course regarding its previous support for a maximum power limit of 50 kW ERP for the entire Lower 700 MHz band demonstrates how it later acted in a

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[14] 3GPP TSG RAN WG4 (Radio) Meeting #47bis, Munich, Germany (June 16-21, 2008), R4-081324 ("*AT&T Contribution*").

[15] *See* call signs WQIZ638 and WQIZ639 in the Commission's Universal Licensing System, *at* http://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp.

[16] *See, e.g.*, WQIZ360.

[17] *See, e.g.*, WQIZ423.

[18] *See, e.g.*, WQIZ578.

[19] Change Request, 3GPP TSG RAN WG4 Meeting #48, Jeju, Korea (August 18-22, 2008), R4-082179.

[20] *See* 3GPP2 Background, *at* http://www.3gpp2.org/Public_html/Misc/AboutHome.cfm.

[21] *See infra* Section III.

calculated manner to promote its own interests. To date, AT&T has never submitted any empirical studies or technical data to 3GPP or into the FCC record to justify the questionable assumptions and conclusions that yielded the establishment of Band Class 17. The absence of such technical data is highly irregular to the 3GPP process, especially considering the then-existing commercial operations of MediaFLO in the Lower D Block, which would have served as an excellent proxy for potential Lower E Block interferers.

In 2006, when the Commission was establishing its service rules for the Lower 700 MHz band, AT&T endorsed "the higher maximum power limit of 50 kW ERP for the Lower 700 MHz Band" to "promote maximum flexibility in the development and deployment of new services," particularly "mobile video and entertainment services."[22] However, after the completion of Auction 73, during the 3GPP deliberations, AT&T raised concerns that the very power limits it previously supported would cause interference concerns to Lower B and C Block reception.[23] As described below, engineering tests have confirmed that AT&T's initial position supporting a maximum power of 50 kW ERP for Lower E Block transmissions was appropriate.[24]

Despite legitimate objections from some vendors about market fragmentation, the reports for the June and August 2008 3GPP meetings demonstrate how AT&T, among others, minimized the adverse impact that the development of Band Class 17 would have on A Block licensees and their competitive standing.[25] For example, 3GPP's report from its June 2008 meeting reflects AT&T discounted Ericsson's market fragmentation concerns by stating that "one subband more may not make a big difference in the market fragmentation" and the creation of this "subband"

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[22] Reply Comments of AT&T, Inc., *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, at 17-18 (filed Oct. 20, 2006).

[23] *See AT&T Contribution* at 1.

[24] *See infra* Section III.

[25] Report of the 3GPP TSG RAN WG4 meeting #47bis, Munich, Germany (June 16-20, 2008) ("*June 2008 3GPP Report*"); Report of the 3GPP TSG RAN WG4 meeting #47bis, Jeju, Korea (August 18-23, 2008).

(*i.e.*, Band Class 17) was "the simplest and the quickest way to solve the [supposed interference] problem."[26] To justify its request for a unique band class for the Lower B and C Blocks, AT&T simply offered conclusory statements based on overstated and unproven assumptions. Nevertheless, with further support from Qualcomm and Motorola,[27] AT&T succeeded in misleading 3GPP members into thinking that the creation of Band Class 17, as a mere "subset," would help address remote adjacent channel interference risks, without any consideration for the profound adverse effects that the absence of Lower 700 MHz interoperability would have on A Block licensees.

AT&T has described the creation of Band Class 17 as the result of an independent standards-setting process that relied on the "advice of numerous technical engineers and other industry experts."[28] However, unique circumstances specific to the Lower 700 MHz band in the United States provided AT&T with an unusual level of control. As described above, the entire deliberations at 3GPP that resulted in the fragmentation of the Lower 700 MHz band consisted only of an introductory contribution by Motorola,[29] a contribution by AT&T,[30] and an opposing contribution from Ericsson.[31] Such a sparse record hardly manifests the wide-reaching consensus among industry stakeholders that AT&T has described.

The circumstances that provided AT&T with an unusual—and unprecedented—level of control within 3GPP began with the definition of the 700 MHz spectrum band. The Commission

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[26] *June 2008 3GPP Report.*

[27] *Id.*

[28] Ex Parte Letter from Joseph Marx, Assistant Vice President – Federal Regulatory, AT&T, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket No. 06-150, PS Docket No. 06-229; GN Docket No. 09-51; RM-11592 (June 3, 2010); *see also* Comments of AT&T Inc., *700 MHz Band Mobile Equipment Design and Procurement Practices*, RM-11592, at 6 (filed Mar. 31, 2010).

[29] *See Motorola Contribution.*

[30] *See AT&T Contribution.*

[31] *See Ericsson Contribution.*

was the first regulatory body in the world to reallocate the 700 MHz Band from the traditional television service to mobile services. The Commission's desire to include dedicated spectrum for public safety and for mobile broadcast services led to a unique band plan. In 2008, the United States was the only country with plans to employ this spectrum in such a manner. Therefore, the only operators in attendance at 3GPP with an interest in the Band Classes 12, 13, 14 and 17 were operators with 700 MHz spectrum holdings in the United States. The major global wireless carriers that are usually active in defining mobile broadband standards—such as Orange, Vodafone, and China Mobile, among others—did not significantly participate in establishing standards for Lower 700 MHz band devices.[32] The vast majority of 3GPP attendees did not have an interest in the Band Class 17 deliberations and saw no reason to contribute or object to what they saw as a U.S.-specific project. As a result, the international carriers that should have acted as a counterbalance to the inefficient market fragmentation advocated by AT&T did not carefully evaluate the technical merits or competitive implications of Band Class 17, and had no reason to predict that the U.S. licensing regime would enable one party to exert undue influence over the 3GPP technical standards. Since 3GPP is a consensus-driven organization, a lack of objection was all that was necessary to approve the change request to create Band Class 17.

The Commission also could not have anticipated how AT&T would exploit its undue market power to promote a fragmented band plan that has no theoretical or practical value, but rather serves only to inhibit competition, circumvent FCC policies, and enable the incumbent carrier to exploit its market power. Likewise, the comparatively small and relatively nascent Lower A Block licensees were not members of the 3GPP standards setting process, and would not

[32] Ex Parte Letter from Michele Farquhar, Hogan Lovells, Counsel to Vulcan Wireless, to Marlene Dortch, Secretary, Federal Communications Commission, WT Dockets 06-150, 11-18, RM-11592, Attachment at 11 (Dec. 5, 2011).

need to become participants under normal circumstances.[33] As noted above, at the time of the 3GPP deliberations on Band Class 17, the small Lower A Block licensees were still awaiting license grants from the FCC, and had not begun to research the status of LTE specifications. Additionally, smaller carriers typically have not needed to participate in the standards setting process, as there has been adequate participation among larger carriers with competing interests to arrive at sound and reasonable technical standards. Moreover, in this case, the Lower A Block licensees were reasonable in believing that 3GPP would adopt Band Class 12 as the governing band class for all Lower 700 MHz bands, as was indicated prior to Auction 73. Consequently, AT&T and its vendors inherited the unusually powerful position of driving the standards for the spectrum bands where AT&T was the dominant license holder. Aside from Ericsson, no other industry stakeholder sought to uncover or chose to express how Band Class 17 and the lack of interoperability in the Lower 700 MHz band could impact the U.S. wireless industry.

The efforts of AT&T and its vendors to establish an additional band class for the Lower 700 MHz band resulted in substantial delay in the final adoption of Band Class 12 standards. In the same month that Band Class 12 was fully ratified, Verizon Wireless—which acquired a substantial amount of Lower A Block spectrum in Auction 73—announced the deployment of its LTE network to cover more than 100 million POPS on its Upper C Block license. Verizon's focus in 3GPP was on Band Class 13, and it was not equally pursuing Band Class 12 activities in 3GPP with the same fervor and conviction.[34] The resulting delay hindered the ability of Lower A Block licensees to plan and build out their networks, and has continued to adversely impact their ability to compete.

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[33] *See supra* nn.15-20 and accompanying text; *see also Dec. 14 Vulcan Ex Parte,* Attachment at 5.

[34] Ex Parte Letter from Michele Farquhar, Hogan Lovells, Counsel to Vulcan Wireless, to Marlene Dortch, Secretary, Federal Communications Commission, RM-11592, Attachment at 2 (Mar. 23, 2011) ("*Mar. 23 Vulcan Ex Parte*").

The lack of adoption of the U.S. 700 MHz band plan by other countries means that a Band Class 12 ecosystem will not develop absent an interoperability requirement. Other countries have recently begun re-allocating the television service in the 700 MHz band to other services. For example, the Asia/Pacific region has approved a new band plan utilizing two 45 MHz blocks of spectrum for LTE FDD service.[35] However, the Asia/Pacific band plan is incompatible with the United States 700 MHz bands, which poses an ecosystem challenge for Band Class 12.[36] Generally, operators benefit when a large number of countries employ the same band class to maximize the addressable market for devices. To date, the only other country planning to follow the US 700 MHz band plan is Canada.[37]

C Spire, which acquired fourteen Lower A Block licenses in Auction 73,[38] found AT&T's conduct in the 3GPP process to be so egregious, blatant, and contrary to the public interest that it recently filed a federal lawsuit against AT&T, Motorola, and Qualcomm in the Northern District of Mississippi.[39] The lawsuit, which alleges violations of the Sherman Act, avers that the defendants engaged in "concerted action designed and intended to delay [C Spire] and other similarly situated carriers from deploying 4G-LTE service on their Band 12 spectrum" by "commandeer[ing] standard-setting activities by" 3GPP.[40] Perhaps more significant is C Spire's allegation, made under penalty of perjury, that representatives from Motorola and Qualcomm

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[35] *See* APT Report on Implementation Issues Associated with Use of the Band 698-806 by Mobile Services, No. APT/AWG/REP-24 (Sept. 2011), *available at* http://www.apt.int/sites/default/files/Upload-files/AWG/APT-AWG-REP-24_APT_Report_698-806_Band_Implementation_UHF.pdf.

[36] *See* Paul Kirby, *Regulators Stress Importance of Harmonization, Cooperation*, TRDaily (Oct. 19, 2011).

[37] *Id.*

[38] *See* Comments of Cellular South, Inc., *700 MHz Block A Good Faith Purchasers Alliance Petition for Rulemaking Regarding the Need for 700 MHz Mobile Equipment to be Capable of Operating on All Paired Commercial 700 MHz Frequency Bands*, RM-11592, at 2 (filed Mar. 31, 2010).

[39] *See Corr Wireless, et al. v. AT&T, Inc., et al.*, Civil Action No. 3:12CV036-DAS (N.D. Miss. Apr. 2, 2012).

[40] *Id.*, Complaint ¶¶ 9-10.

threatened to delay the development of Band Class 12 if C Spire continued to petition the Commission for an interoperability mandate because it was contrary to their commercial interests.[41] While the merits of this pending lawsuit will ultimately be determined by the courts in due course, its mere existence raises serious concerns about how a dominant wireless carrier can hijack the 3GPP process for its own purposes in developing technical standards for the Lower 700 MHz band, as well as the legitimacy of Band Class 17.

III. EXTENSIVE EVIDENCE CONFIRMS THAT INTEROPERABILITY ACROSS THE LOWER 700 MHZ BAND WILL NOT CAUSE HARMFUL INTERFERENCE TO LOWER 700 MHZ B AND C BLOCK DEVICE RECEPTION.

Sound engineering and technical analyses—including lab and field tests (the "Technical Study") conducted by Vulcan and other Lower 700 MHz A Block licensees[42]—confirm that interoperability in the Lower 700 MHz band will not cause harmful interference to Lower B or C Block device reception. Together with other factors, these findings conclusively demonstrate that all of the justifications AT&T has offered to support the creation of Band Class 17 are not valid:

(1) **Channel 51 broadcast operations** will not cause reverse power amplifier intermodulation ("PA IM") interference to Lower B and C Block device reception as shown in the Technical Study. The lack of PA IM interference has been understood by vendor community, as they did not include in the 3GPP specifications any additional protections for PA IM for either Band Class 12 or 17 (and thus the 3GPP specifications as to Channel 51 are the same for Band Classes 12 and 17). The Technical Study further revealed that the strongest Channel 51 transmissions encountered in a market would not cause harmful interference to LTE devices operating on the Lower B and C Blocks, even in the worst case and most unlikely scenarios.

(2) **Lower D Block transmissions** will not cause harmful interference to Lower B and C Block device reception. The Band Class 12 and Band Class 17 3GPP device specifications with respect to the Lower D Block are identical; therefore, no performance difference would result. Furthermore, AT&T's recent acquisition of

[41] *Id.*, Complaint ¶ 11.

[42] The consortium of Lower 700 MHz A Block licensees that conducted the Phase 1 Studies include Vulcan, Cavalier Wireless, C Spire Wireless, Continuum 700, King Street Wireless, MetroPCS, and U.S. Cellular.

all Lower 700 MHz D Block spectrum from Qualcomm, which is now subject to FCC-imposed power restrictions,[43] further assures that transmissions in the Lower D Block will not interfere with device reception in the Lower B and C Blocks

(3) **Lower E Block transmissions** will not cause harmful interference to Lower B and C Block device reception. The Technical Study revealed that Band Class 12 devices adequately protect Lower B and C Block users from high power E Block transmissions. Moreover, LTE devices that are currently commercially available are capable of receiving and managing neighboring signal levels far greater than that which might result from a unified Lower 700 MHz band class. Any perceived risk of E Block interference to Lower B and C Block device reception is further reduced because AT&T holds the E Block licenses in five major U.S. markets, covering a population of approximately 22% of the United States (70 million people). The FCC-imposed power limitations applicable to those licenses eliminate the possibility of interference to Lower B and C Block device reception in those markets.

Although there has been "disagreement over the rationale for the distinct band classes,"[44] AT&T has consistently pointed to Channel 51, Lower D Block, and Lower E Block transmissions as potential sources of interference to Lower B and C Block device reception, and appropriate justifications for the creation of Band Class 17.[45] However, neither AT&T, nor its vendors who advocated for Band Class 17, has ever offered technical data to verify such risks. In view of these definitive facts and findings, the Commission should conclude that Band Class 17 has no

[43] *See* Application of AT&T Inc. and Qualcomm Incorporated for Consent to Assign Licenses and Authorizations, *Order*, WT Docket 11-18, FCC 11-188 (rel. Dec. 22, 2011) ("*AT&T-Qualcomm Order*"). As a condition to the transfer of those licensees, AT&T is prohibited from transmitting in its Lower D and E Block holdings in such a manner that might result in harmful interference to Lower A, B, and C Block licensees. *Id.* ¶ 3 n.1, ¶ 61.

[44] *NPRM* ¶ 3.

[45] *See* Comments of AT&T Inc., *700 MHz Band Mobile Equipment Design and Procurement Practices*, RM-11592, 5 (filed Mar. 31, 2010) ("The rationale for [Band Class 17] is to address possible co-existence issues with High power TV broadcast transmission in Channel 51 and other broadcast transmission in Channel 55 (block D) and channel 56 (block E)."); Ex Parte Letter from Joan Marsh, Vice President – Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 07-293, IB Docket No. 11-149, RM-11592 (Feb. 21, 2012) (explaining that AT&T "would not rule out a migration to Band Class 12" if "the A Block were largely relieved of the interference concerns that prompted the creation of Band Class 17," including "high powered broadcasts by DTV stations on Channel 51" and "high power transmissions on the Lower E Block"); Ex Parte Letter from Joseph P. Marx, Assistance Vice President, AT&T Services, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, RM-11626, RM-11592 (Feb. 28, 2012) ("[O]ur primary concerns [are] still inter-modulation issues on a Band 12 handset . . . as well as Band 12 handset receiver overload issues from high powered E-block transmitters.").

theoretical or practical basis, and promptly implement an interoperability requirement for the Lower 700 MHz band.

A. Channel 51 Transmissions Will Not Cause Harmful Interference to Lower B and C Block Device Reception.

Although AT&T's B and C device receive blocks have 36 MHz of separation from the nearest Channel 51 broadcast operations, AT&T successfully convinced 3GPP to create Band Class 17 after voicing exaggerated concerns about the potential for Channel 51 interference to Lower B and C block devices through the unlikely occurrence of reverse power amplifier intermodulation ("PA IM").[46] However, the Technical Study demonstrates that Channel 51 broadcast transmissions will not cause harmful interference to B and C Block device reception.[47] Moreover, the 3GPP technical specifications for Band Class 17 devices do not address this hypothetical source of interference any differently than Band Class 12, reflecting that PA IM was never a serious technical concern or a valid rationale for the creation of Band Class 17.

First, the Technical Study found that Band Class 12 and Band Class 17 device specifications are identical. As noted in the *Technical Report*, other than the Lower E Block blocking level, "[a]ll other specifications . . . are identical." As a result, both band classes treat

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[46] *See supra* Section II; s*ee also Technical Report* at 41. As the Commission notes, although Motorola raised the specter of reverse IM interference, it failed to "provide evidence showing the circumstances that could produce conditions suitable to create reverse intermodulation interference from Channel 51." *NPRM* ¶ 34.

[47] Band Class 12 standards have always provided wireless operators with sufficient flexibility to control base station interference from high-powered broadcast transmissions. Such standards permit an operator deploying LTE in the Lower B or C Block, such as AT&T, to employ a base station receive filter that was more than adequate to reject Channel 51 TV signals. Accordingly, the initial 3GPP specifications for the Lower 700 MHz A, B, and C Blocks—Band Class 12—adequately ensured that Channel 51 broadcast transmissions would not pose an interference threat to Lower B and C Block base station operations. As noted in the NPRM, "[o]perators deploying networks in the Lower 700 MHz B and C Blocks can continue to filter base station receivers as they would for Band Class 17, and thus interference from Channel 51 to B and C Block base stations is the same regardless of whether Band Class 12 devices or Band Class 17 devices are used." *NPRM* ¶ 32. During 3GPP deliberations, base station vendors agreed that Band Class 12 adequately protected Lower B and C Block base stations from Channel 51 TV operations. *Technical Report* at 41 (*citing* Report of the 3GPP TSG RAN WG4 meeting # 47bis, Munich, Germany, 16-20 June 2008).

Channel 51 transmissions the same. This fact has profound implications, as it completely invalidates one of the central reasons why AT&T sought to create Band Class 17 and demonstrates AT&T's undue influence over the 3GPP vendor community. With respect to Channel 51 broadcast operations, the Band Class 12 and Band Class 17 specifications are no different. The use of any other component in a Band Class 17 device to address potential interference concerns could be utilized to the same effect if employed in Band Class 12 devices.

But even if the Band Class 17 and Band Class 12 specifications were different, the Technical Study conclusively demonstrated that Channel 51 operations have no material impact on LTE devices operating in the Lower B and C Blocks.[48] The lab results verified that commercial LTE devices are capable of operating without material interference in the presence of very strong Channel 51 TV signals.[49] A minimum signal level of -13.5 dBm from Channel 51 would be necessary to create an interference signal at the noise floor of the Lower B Block receiver. But the likelihood of such transmission levels is virtually non-existent: the field measurements and technical analyses revealed that Channel 51 Full Power DTV station transmissions were no stronger than -21dBm, substantially lower than the power levels necessary to generate measurable PA IM interference.[50] Thus, even under the most unlikely scenario of an extremely strong DTV signal and an LTE device receiving at its weakest level, the reverse PA IM strength would be more than 7 dB below the relevant noise floor, far too weak to cause any degradation to the performance of B or C Block devices. This conclusion holds even if the device receiver is within two kilometers of a Channel 51 broadcast tower.[51]

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[48] *Technical Report* at 42.

[49] *Id.*

[50] *NPRM* ¶ 36; *Nov. 25 Vulcan Ex Parte*, Attachment at 13-14.

[51] The highest interference levels are not directly below an antenna of a high power transmission system, or anywhere close to the antenna: "To cover large areas…, a system should (a) use antennas with small extent
(continued on next page)

Finally, the field measurements validated that the confluence of circumstances necessary for reverse PA IM interference to occur is extremely unlikely in any event.[52] For reverse PA IM to cause interference, three coinciding criteria must occur: (1) Channel 51 signal level at the LTE device must be strong; (2) the LTE device must be transmitting at very high power near the upper edge of the 10 MHz LTE channel (*i.e.*, the Lower C Block); and (3) the LTE device must be simultaneously receiving on the resource blocks impacted by the intermodulation products (Lower B Block).[53] Even if the Channel 51 TV signal could reach unrealistically high levels, PA IM is not likely to occur.

B. Lower D Block Transmissions Will Not Cause Harmful Interference to Lower B and C Block Device Reception.

The second reason that AT&T has offered to justify the establishment of Band Class 17—the potential for Lower D Block transmissions to cause harmful interference to Lower B and C Block device reception[54]—is also invalid, for the simple reason that AT&T is now the sole licensee of the Lower D Block spectrum. Following its spectrum acquisition from Qualcomm, AT&T now holds all six of the Lower 700 MHz D Block licenses.[55] As a condition to receiving those licenses, AT&T is prohibited from transmitting in its Lower D Block in such a manner that might result in harmful interference to Lower A, B, and C Block licensees.[56] Consequently,

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in elevation, and (b) point the antenna close to the horizon. In other words, pointing an antenna down is not optimal when the goal is to cover large areas, so that the power levels and greatest potential interference will not be within the 12 square kilometer area of a Channel 51 transmitter." Ex Parte Letter from Michele Farquhar, Hogan Lovells, Counsel to Vulcan Wireless, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket No. 11-18, RM-11592, Attachment 2 at 1 (Dec. 12, 2011).

[52] *Technical Report* at 42.

[53] *See id.* at 41-42.

[54] *See Motorola Contribution*.

[55] *AT&T-Qualcomm Order* ¶ 15.

[56] *Id.* ¶ 3 n.1, ¶ 61.

AT&T's acquisition of this spectrum not only provided it with 6 MHz of nationwide spectrum, it also eliminated one of the reasons that AT&T put forth to create Band Class 17 in the first place.

Additionally, the 3GPP device specifications for Band Class 12 and Band Class 17 with respect to the Lower D Block are identical. No difference in device performance would be discernible in the presence of a high-power broadcast transmission within the Lower D Block.

C. Lower E Block Transmissions Will Not Cause Harmful Interference to Lower B and C Block Device Reception.

The Technical Study further demonstrated that AT&T's final basis for Band Class 17—that high powered E Block transmissions may cause harmful blocking interference to B and C Block device reception—also lacks merit. The lab and field tests performed to assess the legitimacy of this claim confirmed that Band Class 12 devices would provide more than sufficient protection against Lower B and C Block reception of high powered E Block transmissions.[57] Additionally, the Technical Study confirmed that commercially available Band Class 17 devices currently receive and manage interfering signal levels from within the Lower B, C, and Upper C Blocks that are similar in strength to the Lower E broadcast signals, and are capable of receiving and successfully managing neighboring signal levels far greater than that which might result from a unified Lower 700 MHz band class.

The perceived risk that high powered E Block transmissions will cause harmful interference to Lower B and C Block devices is further mitigated in light of AT&T's recent acquisition of Lower E Block spectrum covering some of the largest metropolitan areas in the country, including New York, Boston, Philadelphia, Los Angeles, and San Francisco.[58]

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[57] *Technical Report* at 17. The field measurements further revealed that the highest signal power ratios between the 50 kW Lower E Block and B Block are typically 15 to 30 dB lower than the levels necessary to cause blocking interference to Lower B Block receivers. *See Nov. 25 Vulcan Ex Parte*, Attachment at 17.

[58] *AT&T-Qualcomm Order* ¶ 1.

Collectively, these markets cover a population of approximately 22% of the United States (70 million people).[59] As with its D Block holdings, AT&T is subject to FCC-imposed conditions that prohibits it from transmitting on the Lower E Block in such a manner that might cause harmful interference to Lower A, B, and C Block licensees.[60]

D. The Technical Study Demonstrates that Band Class 17 Has No Practical or Theoretical Basis.

The results of the Technical Study, which AT&T has yet to refute with its own data, lead to but one conclusion: Channel 51 and Lower E Block transmissions do not pose an interference threat to Lower B and C Block device reception, Band Class 17 has no practical or theoretical basis for existing, and all of AT&T's Band Class 17 devices could employ Band Class 12 duplexers and experience no adverse change in performance.[61] Accordingly, the Commission should ignore the speculative and unsubstantiated claims that AT&T and few others have offered to justify the creation of fragmented technical standards for the Lower 700 MHz band.

E. The Commission Should Not Allow Opponents of Interoperability to Mischaracterize Barriers to Lower A Block Network Deployment as Reasons Militating Against a Lower 700 MHz Interoperability Mandate.

Opponents of interoperability have seized upon the presence of Channel 51 operations and high powered E Block transmissions to conflate two fundamentally distinct issues—(i) the ability of A Block licensees to deploy commercial service and the related base station interference issues, and (ii) the viability of interoperability in the Lower 700 MHz band. Vulcan urges the

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[59] *Id.*; *see also* U.S. & World Population Clock – U.S. Census Bureau, at http://www.census.gov/population/www/popclockus.html.

[60] *AT&T-Qualcomm Order* ¶ 3 n.1, ¶ 61.

[61] *See Technical Report* at 65.

Commission to recognize that these two issues are discrete, and should be addressed separately.[62] Although Channel 51 and high powered E Block transmissions impact how A Block licensees can deploy their base stations, they *do not* impact device performance or constitute impediments to Lower 700 MHz interoperability, and do not mitigate the need for the Commission to facilitate the development of devices and equipment capable of operating across the entire Lower 700 MHz band. Resolution of the Lower A Block deployment obstacles is by no means a prerequisite to achieving interoperability in the Lower 700 MHz band.

Accordingly, the Commission can adopt an interoperability mandate without heeding AT&T's request to "modify the rules governing service in Channel 51 and in the 700 MHz Lower E Block,"[63] and should disregard AT&T's pleas to alleviate the A Block interference concerns before implementing Lower 700 MHz interoperability.[64] If such tactics are not intentionally designed to confuse the Commission as it tackles these complex matters, they mischaracterize and conflate the issues, and distract the Commission from addressing the vital need for interoperability in the Lower 700 MHz band. Adjacent channel interference and the lack of Lower 700 MHz interoperability are both problems that have delayed service in the A Block, and therefore raise significant problems *unique to A Block licensees*. As AT&T is not an A Block licensee, it has no reasonable basis to implore the Commission to resolve such base station interference-related concerns *before* achieving interoperability in the Lower 700 MHz band. Indeed, Vulcan and the other A Block licensees have never even suggested that resolution of the Channel 51 and E Block

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[62] *See* Ex Parte Letter from Michele Farquhar, Hogan Lovells, Counsel to Vulcan Wireless, to Marlene H. Dortch, Secretary, Federal Communications Commission, RM-11626, RM-11592 (Mar. 12, 2012) ("*March 12 Vulcan Ex Parte*"); *May 25 Lower A Block Licensee Ex Parte* at 2.

[63] *NPRM* ¶ 42.

[64] *See, e.g.*, Ex Parte Letter from Robert W. Quinn, Jr., Senior Vice President, Federal Regulatory and Chief Privacy Officer, to Marlene H. Dortch, Secretary, Federal Communications Commission (May 22, 2012) ("[F]inding a path for the Commission to clear Channel 51 spectrum and resolving the issues around E-Block power limits quickly would resolve interference concerns that today are preventing widespread deployment of A Block spectrum.").

interference concerns is a necessary predicate to an interoperability mandate.[65] As both problems—adjacent band interference and non-interoperability—have frustrated Lower A Block licensees in rolling out commercially viable service, they both require prompt resolution, in any order possible.

IV. THE LACK OF INTEROPERABILITY ACROSS THE LOWER 700 MHZ BAND HAS HARMED CONSUMERS AND FRUSTRATED THE PUBLIC INTEREST BY PREVENTING LOWER A BLOCK LICENSEES FROM DEPLOYING VIABLE NETWORKS.

A. Non-Interoperability Has Thwarted the Development of Standards, Devices, Equipment, and Technology for Lower A Block Licensees.

Although there is general consensus that a unified band class across the Lower 700 MHz band "has the potential to yield significant benefits for all licensees,"[66] in resolving this proceeding, the Commission should give due consideration to how the fragmented Lower 700 MHz band has prevented Lower A Block licensees from obtaining commercially viable devices, equipment, and technology for their networks.[67] Although a limited number of Band Class 12 devices have recently become available in the marketplace, they suffer from severe shortcomings that only magnify the costs of non-interoperability in the Lower 700 MHz band. Such devices are most appropriately viewed as "save the subscriber" devices that offer consumers dramatically limited 4G network service. For a greenfield operator like Vulcan, these devices are woefully inadequate at providing any competitive offering to support the deployment of service. Without

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[65] As Vulcan has previously explained, "[t]he Commission does not need to resolve A Block deployment issues to reach a timely decision mandating Lower 700 MHz interoperability." *March 12 Vulcan Ex Parte* at 2. Likewise, a consortium of Lower A Block licensees recently explained that "[p]otential interference to Lower A Block base station reception from Channel 51 broadcast stations . . . is a base station interference issue relevant only to Lower A Block deployment in some markets. Such deployment issues are not relevant to interoperability or band class considerations, and do not impact device reception for Lower B and C Block users." *May 25 Lower A Block Licensee Ex Parte* at 2.

[66] *NPRM* ¶ 4.

[67] Vulcan has extensively documented the unprecedented nature of, and the insurmountable obstacles created by, the lack of interoperability in the Lower 700 MHz band. *See generally* Vulcan's filings in RM-11626, RM-11592, and WT Docket 11-18.

readily available equipment that works across the Lower 700 MHz band, the ability to attract potential retail or wholesale customers and provide service on A Block spectrum is not practical.

Any suggestion that supply will ultimately meet the Lower A Block demand for equipment defies the marketplace reality that competitive handsets for the Lower A Block have not emerged.[68] U.S. Cellular's recent introduction of a Band Class 12 device—the Samsung Galaxy S Aviator, the carrier's only 4G smartphone device—provides a telling example of the equipment-related difficulties that Lower A Block licensees have faced. Given the severe limitations of this handset, claims that its commercial introduction reflects a functional marketplace belie credibility, for several reasons. First, the device is considerably restricted in its coverage areas, particularly given the inability of Lower A Block licensees to enter into voice and data roaming arrangements due to non-interoperability in the Lower 700 MHz band.[69] Therefore, this device is not a true competitor to the 4G devices offered by larger carriers like AT&T and Verizon, which benefit from far superior network coverage. The obvious deficiencies in U.S. Cellular's 4G device are reflected in the marketplace media coverage. In its review of the Samsung Galaxy S Aviator, CNET, the popular technology website, concluded that "the carrier's limited 4G LTE access . . . weigh[s] down" the handset, and notes that the reviewer "couldn't test its 4G skills since [U.S. Cellular's] LTE network is limited to just a few locations."[70]

Second, although the lack of interoperability has thwarted network deployment for all Lower A Block licensees, U.S. Cellular's competitive posture and incumbent operations are unique relative to most Lower A Block licensees. U.S. Cellular, a publicly traded company with

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[68] *See, e.g.*, Ex Parte Letter from Tamara Preiss, Vice President – Federal Regulatory Affairs, Verizon, to Marlene Dortch, Secretary, Federal Communications Commission at 3 (Mar. 2, 2011).

[69] *See infra* Section IV.C.

[70] Samsung Galaxy S Aviator (U.S. Cellular) | CNET TV | Video Product Reviews, CNET Podcasts, Tech Shows, Live CNET Video, *at* http://cnettv.cnet.com/samsung-galaxy-aviator-us-cellular/9742-1_53-50123741.html.

over 5.8 million customers as of March 31, 2012, is the sixth largest wireless carrier in the country with operations in 26 states.[71] It also holds substantial spectrum resources compared to most Lower A Block licensees.[72] Consequently, of all A Block licensees, U.S. Cellular is among the best situated to weather the storm caused by non-interoperability because it can exploit its alternative resources, vendor relationships, and market presence to attract some handset development. By contrast, most Lower A Block licensees are small, rural, and/or greenfield operators that lack even the smallest amount of market power and economies of scale to achieve even those modest results.[73] There can be no doubt that the equipment-related problems caused by non-interoperability in the Lower 700 MHz band remain insurmountable for the vast majority of Lower A Block licensees.

Finally, a single device does not alone render a carrier's operations commercially sound. Rather, an operator may only thrive only if it offers a range of devices—regardless of whether it provides retail or wholesale service. If a carrier provides retail service, it must offer an assortment of handsets to satisfy diverging consumer tastes and preferences. Likewise, if a carrier offers wholesale service, its network must be capable of supporting all of the devices offered by its retail carrier customers. Lower A Block licensees, like all carriers, require a sufficient *quantity* and *variety* of handsets to meet consumer demand. Absent Lower 700 MHz interoperability, A Block licensees will lack the scale necessary to incentivize device makers to engage in the necessary equipment development.

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[71] *See* United States Cellular Corporation, Form 10-Q at 17 (Mar. 31, 2012), *available at* http://www.sec.gov/Archives/edgar/data/821130/000082113012000013/form10q.htm.

[72] Additionally, to deploy its 4G service (which only covers 25 percent of its service areas), U.S. Cellular has combined its 700 MHz spectrum holdings with those of King Street Wireless. *Id.*

[73] *See infra* Section IV.D.

Without interoperability, Lower A Block licensees cannot leverage the economies of scale that are essential for equipment manufacturers to invest in developing devices, equipment, and chipsets for Lower A Block licensees.[74] Equipment manufacturers have little to no incentive to meet the needs of smaller wireless carriers that, due to the unnecessarily disjointed 3GPP standards in the Lower 700 MHz band, are only technically capable of providing service over their limited service areas.[75] This reality has been apparent in Vulcan's efforts to obtain devices and equipment that consumers actually want. Other Lower A Block licensees have been similarly impacted. As the Rural Telecommunications Group has stated, "equipment manufacturers have little incentive to innovate and provide compatible devices for smaller markets, particularly when providing interoperable devices would run contrary to their largest customers' desires."[76] Likewise, a consortium of Lower A Block licensees,[77] which first petitioned the Commission for an interoperability mandate in 2009, has stated that the disjointed Lower 700 MHz band classes "will virtually assure that equipment needed by Block A licensees in smaller volumes will be available only later in time and at considerably higher price points."[78] Accordingly, interoperability across the Lower 700 MHz band is essential to avoid further delay in the development of devices and equipment necessary for Lower A Block licensees to offer competitive service.

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[74] Mar. 23 Vulcan Ex Parte, Attachment at 2; *see also NPRM* ¶ 18 ("[L]ack of interoperability in the Lower 700 MHz band has cut off meaningful access for many Lower A Block licensees to cutting-edge devices, and even those that do have access are able to acquire only a fraction of what other 700 MHz licensees are able to procure.").

[75] *Vulcan May 27, 2011 Ex Parte*, Attachment at 11; *NPRM* ¶ 18.

[76] Rural Telecommunications Group, Reply Comments, WT Docket No. 11-18, at 10 (Mar. 28, 2011) (http://apps.fcc.gov/ecfs/document/view?id=7021235606).

[77] This consortium, the 700 MHz Block A Good Faith Purchasers Alliance, consists of Cellular South Licenses, Inc.; Cavalier Wireless, LLC; Continuum 700, LLC; and King Street Wireless, L.P. *NPRM* ¶ 11 n.26.

[78] *Good Faith Alliance Petition* at 2.

B. Non-Interoperability Has Resulted in Stranded Investment, Stifled Competition, and Related Economic Harms, Especially in Rural and Unserved Areas.

As a result of the equipment-related obstacles caused by the lack of Lower 700 MHz interoperability, A Block licensees have been unable to reasonably plan their network deployments or offer competitive mobile broadband service to consumers. This, in turn has resulted in stranded investment, inefficient use of spectrum, reduced competition, and stifled marketplace innovation. By eliminating these public interest harms through an interoperability mandate, the Commission can further satisfy its statutory obligation to "promote the widest deployment of communications services, ensure the most efficient use of spectrum, and protect and promote vibrant competition in the marketplace.[79]

The presence of two distinct band classes in the Lower 700 MHz band has led to billions of dollars of stranded investment and related economic harm. In Auction 73, the Lower A Block yielded approximately $3.96 billion in auction proceeds, nearly $1.4 billion of which was from small, regional, or greenfield providers.[80] While the costs of stranded investment are objectionable in any event, they are especially unacceptable and problematic in this case because they have directly impacted licensees with the fewest resources, but who have the highest potential to infuse the U.S. wireless marketplace with healthy competition.[81] Meanwhile, the country's two

[79] *NPRM* ¶ 1.

[80] Auction of 700 MHz Band Licenses Closes; Winning Bidders Announced for Auction 73, *Public Notice*, DA 08-595, at 2 (Mar. 20, 2008).

[81] The absence of healthy competition in the CMRS marketplace is evident in the Commission's recent annual wireless competition report. *See* Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services; *Fifteenth Report*, WT Docket No. 10-133, FCC 11-103 (rel. June 27, 2011) ("*Fifteenth Report*"). In contrast to prior wireless competition reports, the *Fifteenth Report* failed to conclude that the CMRS marketplace is subject to effective competition. *See, e.g.*, Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, *Thirteenth Report*, WT Docket No. 08-27, DA 09-54 ¶ 274 (rel. Jan. 16, 2009).

largest wireless carriers, Verizon Wireless and AT&T—which accounted for more than 64% of the wireless industry revenues as of the year-end 2009,[82] and which have billions of dollars in capital and resources—have not suffered any costs of non-interoperability. Rather, AT&T has contributed to those costs by vehemently opposing Lower 700 MHz interoperability, thereby constructing a sizeable barrier to entry in the marketplace, and delaying the emergence of much-needed competition.

The adverse impact of stranded investment is far more profound and far-reaching than the mere auction value of the Lower A Block licenses. As Chairman Genachowski recently explained to Congress, "economists regard the economic value created by FCC auctions as being about 10 times" the value obtained at auction.[83] By that metric, the Lower A Block licensed to small, regional, and greenfield carriers should create approximately $1.4 billion of value which has not materialized. Moreover, each day of delay in A Block service caused by non-interoperability results in significant compounded harm to the economy, contrary to the public interest.

The lack of competitive service from Lower A Block licensees is especially problematic for consumers residing in rural areas. As the Commission knows, "a significant number of Lower A Block licenses are held by smaller, rural, and regional licensees."[84] The NPRM also appropriately notes that "the record to date suggests that, unless mobile user equipment is capable of operating on all paired commercial Lower 700 MHz spectrum, the deployment of facilities-based mobile broadband networks could be hampered, *particularly in rural and unserved*

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[82] *Fifteenth Report*, Table 4 at 35. Verizon and AT&T have more than twice the revenue of the third and fourth largest wireless operators combined. *Id.*

[83] Statement of Chairman Julius Genachowski, Federal Communications Commission, Hearing on the FCC's Fiscal 2013 Budget Request Before the Subcommittee on Financial Services and General Government, Committee on Appropriations, U.S. House of Representatives (Mar. 19, 2012), available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0319/DOC-313081A1.pdf.

[84] *NPRM* ¶ 22.

areas."[85] The Small Business Administration recently explained to the Commission in this proceeding that mobile broadband has become essential for "rural communities," where small businesses require access "to a variety of innovative mobile broadband applications."[86] As such, "consumers in rural America have an important stake in the outcome" of this proceeding and in the development of service in the Lower 700 MHz band.[87] By mandating interoperability in the Lower 700 MHz band, the Commission can further the prompt deployment of competitive mobile broadband service in rural America, and substantially mitigate the harm that has befallen consumers residing in those areas. Such an action would clearly align with longstanding policies of the Commission and the Executive Branch.[88]

C. Non-Interoperability Has Foreclosed the Development of Voice and Data Roaming Arrangements.

Lack of interoperability in the Lower 700 MHz band also forecloses the ability of Lower A Block licensees to enter into voice and data roaming agreements with other carriers. Without viable devices or equipment capable of functioning on other spectrum blocks within the Lower 700 MHz band, A Block licensees will continue to be unable to execute roaming agreements necessary to offer a nationwide mobile broadband service that meets consumer needs.[89] Similarly, without the ability to offer consumers the ability to roam outside their licensed territories, A Block licensees cannot achieve the customer base or economies of scale necessary to incentivize device

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[85] *Id.* (emphasis added).

[86] Comments of the Office of Advocacy, U.S. Small Business Administration, *Promoting Interoperability in the 700 MHz Commercial Spectrum*, WT Docket No. 12-69, at 2 (filed May 24, 2012) ("*SBA Comments*").

[87] *See* Comments of Rural Cellular Association, *700 MHz Mobile Equipment Capability; Petition for Rulemaking Regarding the Need for 700 MHz Mobile Equipment to be Capable of Operating on All Paired Commercial 700 MHz Frequency Bands*, RM-11592, at 4 (Mar. 31, 2010).

[88] *See, e.g.*, Bringing Broadband to Rural America: Update to Report on a Rural Broadband Strategy, GN Docket No. 11-16 (rel. June 17, 2011), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2011/db0622/DOC-307877A1.pdf.

[89] *See Good Faith Reply Comments* at 22-23.

manufacturers to design the necessary devices and equipment. This cycle places Lower A Block licensees at a fundamental disadvantage to other carriers that do not suffer from non-interoperability. As Chairman Genachowski has stated, "[m]obile providers must be able to offer nationwide voice and data plans to have any chance of competing in today's market."[90] This ability to enter into voice and data roaming arrangements is particularly essential for greenfield operators, such as Vulcan.[91]

The importance of roaming capabilities is beyond doubt.[92] Having recognized how critical roaming is to a vibrant, competitive, and seamless U.S. wireless ecosystem, the Commission has adopted rules requiring wireless carriers to provide voice and data roaming services to other carriers upon reasonable and non-discriminatory terms.[93] In adopting such rules, the Commission expressly acknowledged that roaming capabilities further the public interest and yield consumer benefits by promoting:

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[90] Jasmin Melvin, *FCC Mandates Wireless Data Roaming*, Reuters (Apr. 7, 2011), *available at* http://www.reuters.com/article/2011/04/07/us-fcc-data-roaming-idUSTRE7365VG20110407.

[91] *See infra* Section IV.D; s*ee also* Ex Parte Letter from Thomas Gutierrez, Lukas, Nace, Gutierrez & Sachs, LLP, Counsel to Cavalier Wireless, LLC, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket 11-18, RM-11592 (Dec. 7, 2011) ("Without roaming, Band 12 carriers will be very hard-pressed to make a competitive offering, especially in 'green field' situations.").

[92] Even AT&T—the second largest wireless carrier in the country—cannot deny the importance of roaming agreements, which AT&T relies heavily upon to provide its customers' with a nationwide footprint and receive service in areas where AT&T's network is not deployed. *See* AT&T INC., Form 10-K (Dec. 31, 2011) ("Roaming services enable our subscribers to utilize other carriers' networks when they are 'roaming' outside our network footprint."), *available at* http://www.sec.gov/Archives/edgar/data/732717/000073271712000025/ye11_10k.htm.

[93] *See* Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers, *Report and Order and Further Notice of Proposed Rulemaking*, WT Docket No. 05-265, FCC 07-143 (rel. Aug. 16, 2007) ("*Voice Roaming Order I*"); Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services, *Order on Reconsideration and Second Further Notice of Proposed Rulemaking*, WT Docket No. 05-265, FCC 10-59 (rel. Apr. 21, 2010) ("*Voice Roaming Order II*"); Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services, *Second Report and Order*, WT Docket No. 05-265, FCC 11-52 (rel. Apr. 7, 2011) ("*Data Roaming Order*").

- connectivity for, and nationwide access to, communications services by enabling consumers "to remain connected when they travel outside their own provider's network coverage areas;"[94]

- innovation and investment in mobile broadband networks, consistent with the recommendations of the National Broadband Plan;[95]

- the development of competitive service offerings for the benefit of consumers, by ensuring the viability of new wireless network deployments;[96]

- seamless mobile service throughout the country;[97] and

- consistent coverage and service quality;[98]

By baselessly alleging that Lower 700 MHz interoperability is technically infeasible (due to the disjointed technical standards) opponents of an interoperability mandate have not only skirted the Commission's roaming rules, but have also erased the well-known benefits that roaming provides to consumers, and intentionally disregarded the fundamental role it plays in the U.S. wireless ecosystem.

To witness the limitations of inadequate roaming coverage, the Commission need only look to the scope of service available to U.S. Cellular subscribers using the Samsung Galaxy S Aviator.[99] Although subscribers using that device may receive 4G service in markets where U.S. Cellular and its wireless partner, King Street Wireless, hold licenses, they cannot receive 4G service by roaming on Lower 700 MHz B and C Block networks. For this reason, at least one prominent product review has criticized the device as suffering from "limited 4G LTE access."[100] By reconsolidating the paired spectrum bands in the Lower 700 MHz band through an

[94] *Data Roaming Order* ¶ 1.
[95] *Id.* ¶ 1; *Voice Roaming Order II* ¶ 1.
[96] *Data Roaming Order* ¶ 1; *Voice Roaming Order II* ¶ 1.
[97] *Voice Roaming Order I* ¶ 27; *Voice Roaming Order II* ¶ 2.
[98] *Voice Roaming Order I* ¶ 27.
[99] *See supra* Section IV.A.
[100] *Id.*

interoperability mandate in this proceeding, and facilitating the commercial development of mobile devices capable of operating across the entire Lower 700 MHz band, the Commission can help eliminate the substantial consumer harm that has followed from reduced roaming capabilities in the Lower 700 MHz band.

D. Non-Interoperability Has Been Especially Problematic for Greenfield Operators.

While interoperability will benefit all Lower A Block licensees, it is most critical to greenfield operators, such as Vulcan, who have been especially impacted by the lack of interoperable devices and equipment in the Lower 700 MHz band. Even Verizon, which opposes a Lower 700 MHz interoperability mandate, has conceded that the Commission should address the challenges in the Lower A Block "expeditiously given the long lead times to construct 700 MHz systems, particularly greenfield systems."[101] Given that the Wireless Telecommunications Bureau did not recently conclude that effective competition exists in the CMRS market, the Commission should take steps to encourage the entry of greenfield operators, rather than allow a regulatory landscape that stifles competition.[102]

Absent interoperability, greenfield operators will simply be unable to compete—or even adequately plan how they could compete in a reasonably competitive market. In contrast to incumbent wireless carriers, greenfield operators do not have any existing devices, equipment, vendor relationships, roaming agreements, or other licensed spectrum on which they can deploy service. This, in turn, will prevent them from acquiring and retaining customers.[103] Such a competitive posture will yield unmanageable negative feedback: without customers, greenfield

[101] Ex Parte Letter from Tamara Preiss, Vice President – Federal Regulatory Affairs, Verizon, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket 06-150, RM-11592 (Sept. 1, 2011).

[102] *See Fifteenth Report*.

[103] *See* Ex Parte Letter from Thomas Gutierrez, Lukas, Nace, Gutierrez & Sachs, LLP, Counsel to Cavalier Wireless, LLC, Continuum LLC, and King Street Wireless, LP, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket 11-18, RM-11592, at 2 (Feb. 23, 2012).

operators will have no volume; without volume, greenfield operators will be unable to obtain reasonably priced devices and equipment; without reasonably priced devices and equipment, greenfield operators will be forced to charge higher service prices; charging higher service prices will further reduce the ability of greenfield operators to attract customers. The absurdity and unsustainability of such a cycle is self-evident. Additionally, without interoperable devices and readily available device components, other carriers will not have the option to potentially enter into wholesale agreements with A Block licensees, further limiting the business model options for greenfield operators like Vulcan. To foreclose these harmful results, the Commission must act promptly to mandate interoperability in the Lower 700 MHz band.

E. The Public Interest Harms Caused by Non-Interoperability Will Compound and Worsen With the Passage of Time.

Without a prompt interoperability mandate in the immediate future, the competitive harm to Lower A Block licensees will compound and worsen. By continuing to offer its subscribers Band Class 17 devices, AT&T is establishing an entrenched, nationwide base of consumers that will have no ability to send or receive communications on A Block networks. The entrenchment of non-interoperable devices will also facilitate the development of new generations of non-interoperable phones and tablets, further stifling effective competition and compounding the harm to consumers. Subscribers with non-interoperable devices will not only be unable to receive service from Lower A Block networks, but they will be less willing or likely to seek service from Lower A Block licensees for a considerable period of time, given the consumer costs of switching devices and networks. For example, absent interoperability, consumers that pay up to $830 to purchase a tablet are locked into only one wireless service provider and cannot seek an alternative provider, even after their contract expires (without spending additional money on a new device). Conversely, if such phones and tablets included interoperable components, greenfield operators like Vulcan could provide a competing data service for consumers who purchase such devices,

thereby providing a competitive offering in the marketplace that could greatly benefit consumers. Accordingly, the Commission's prompt adoption of an interoperability requirement would enhance consumer choice.

The continuing lack of interoperability will also continue to prevent Lower A Block licensees from garnering the attention of 3GPP and the vendor community. If Band Class 17 is allowed to proliferate at its current pace, device manufacturers will be even less likely to devote resources to developing Band Class 12 devices, or even devices that operate across the Lower 700 MHz band. Furthermore, consumers will not have access to alternative wireless service offerings for the devices that they purchase.

V. THE COMMISSION SHOULD ADOPT A SIMPLE INTEROPERABILITY SOLUTION TO RECONSOLIDATE THE PAIRED SPECTRUM IN THE LOWER 700 MHZ BAND BEFORE THE END OF 2012.

Given the obvious harm to the public interest caused by non-interoperability in the Lower 700 MHz band, and the absence of any interference to Lower B and C Block operators or their subscribers would face following an interoperability mandate, the cost-benefit analysis of a unified Lower 700 MHz band plan is clear. Such a requirement would impose minimal costs on Lower B and C Block licensees, while reducing the acute costs imposed on A Block licensees. This would in turn lessen the attendant consumer and public interest harms caused by non-interoperability, which will only compound with the passage of time as new Band Class 17 devices and equipment are introduced to the market. Accordingly, Vulcan urges the Commission to adopt a simple interoperability mandate before the end of 2012.

A. The Commission Should Focus Exclusively on Interoperability in the Lower 700 MHz Band in this Proceeding.

The Commission should focus on mandating interoperability across the Lower 700 MHz band in this proceeding, as opposed to the entire band.[104] By focusing on the Lower 700 MHz band, the Commission can take prompt action to mitigate the clear obstacles that have been limited to Lower 700 MHz spectrum since the close of Auction 73. Doing so will also help unleash competitive mobile broadband service in the Lower A Block, which represents 12 MHz of prime spectrum that could be deployed throughout the country, including in some of the most capacity-constrained markets.[105] Given the immense demand for spectrum and diminishing levels of competition in the U.S. wireless market, the Commission should strive for a course of action that fosters the development of commercial mobile service as soon as possible. Focusing on interoperability in the Lower 700 MHz band in this proceeding will achieve that end.

Moreover, as the Commission correctly notes, there are "unique interference environments and different technology-related issues . . . that are specific to the Lower versus Upper 700 MHz bands."[106] Consequently, a consideration of Upper 700 MHz interoperability would raise unique and potentially complicated technical issues, such as how to best implement both Band Class 13 and Band Class 14 into a single device, and how to adequately protect GPS and public safety operations from interference.[107] Such complex questions would require the Commission to develop an entirely new record. By contrast, the Commission has at its disposal a well-established record regarding interoperability in the Lower 700 MHz band.[108] Such a record, which has

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[104] *NPRM* ¶ 46.

[105] *March 12 Vulcan Ex Parte*, Attachment at 7.

[106] *NPRM* ¶ 46.

[107] *Id.*

[108] *March 12 Vulcan Ex Parte*, Attachment at 7.

already informed much of the Commission's understanding of the benefits that would follow from a unified Lower 700 MHz band class, does not yet exist for the Upper 700 MHz band.[109]

Finally, adopting an interoperability mandate in the Lower 700 MHz band will ultimately provide the Commission with a framework for achieving broader interoperability measures applicable to the Upper 700 MHz band, and thereby enhance public safety in the Upper D Block.[110] A mandate that relates exclusively to the Lower 700 MHz band will help guide the Commission in crafting any additional interoperability requirements, should the need arise in the future.

B. There is General Consensus that Lower 700 MHz Interoperability Will Yield Substantial Public Interest Benefits.

The benefits of Lower 700 MHz interoperability are not in dispute. The Commission correctly notes that "[t]here is express agreement . . . that a unified band class across the Lower 700 MHz band has the potential to yield significant benefits for all licensees."[111] Even AT&T has recognized the increased opportunity for commercial relationships with A Block licensees" if interoperability were achieved,[112] and that "an open and seamless wireless ecosystem will fuel the future of mobile broadband."[113]

The Commission itself "historically has been interested in promoting interoperability" and has consistently found that "consumer equipment should be capable of operating over the entire range of cellular spectrum as a means to 'insure full coverage in all markets and compatibility on a

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[109] *Id.*

[110] *Id.*

[111] *NPRM* ¶ 4.

[112] *See id.* ¶ 4 (*citing* Letter from Joan Marsh, Vice President – Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 11-18 (Dec. 21, 2011)).

[113] Ex Parte Letter from Joan Marsh, Vice President – Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 05-265, RM-11592 (Feb. 7, 2011).

nationwide basis.'"[114] For example, in 1981, the Commission adopted interoperability requirements for cellular service.[115] Similarly, with respect to Personal Communications Service, the Commission concluded that "interoperability standards will deliver important benefits to consumers and help achieve our objectives of universality, competitive delivery of PCS that includes the ability of consumers to switch between PCS systems at low cost, and competitive markets for PCS equipment."[116] Accordingly, a rule requiring interoperability in the Lower 700 MHz band would not only be consistent with the Commission's traditional support for technical interoperability, but also allow the Commission to satisfy its statutory obligation to "promote the widest possible deployment of communications services, ensure the most efficient use of spectrum, and protect and promote vibrant competition in the marketplace."[117]

C. An Industry Solution Has Not Developed, and Is Not Likely to Emerge.

Notwithstanding the general agreement that a unified band class in the Lower 700 MHz band would result in benefits for all licensees in the Lower 700 MHz band, and despite the consistent efforts by A Block licensees to resolve their interoperability concerns in the

[114] *NPRM* ¶ 17 (*quoting* Inquiry Into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems; and Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications Systems, *Report & Order*, CC Docket No. 79–318, 86 FCC 2d 469, 482 (1981) ("*Cellular R&O*")); *see also NPRM* ¶ 5 n.5 ("The Commission has a longstanding interest in promoting the interoperability of mobile user equipment in a variety of contexts as a means to promote the widest possible deployment of mobile services, ensure the most efficient use of spectrum, and protect and promote competition.").

[115] *Cellular R&O*.

[116] *NPRM* ¶ 17 (*quoting* Amendment of the Commission's Rules to Establish New Personal Communications Services, RM-7140, RM-7175, RM-7618, GEN Docket No. 90-314, *Memorandum Opinion and Order*, 9 FCC Rcd 4957, 5021-22 ¶¶ 163-64 (1994)). Likewise, when it implemented rules pursuant to the All Channel Receiver Act, the Commission mandated that TV tuners operate both on UHF and VHF bands. *See* 47 U.S.C. § 303(s) (granting the Commission statutory authority "authority to require that [a device] designed to receive television pictures broadcast simultaneously with sound be capable of adequately receiving all frequencies allocated by the Commission to television broadcasting"). As Vulcan has previously noted, that Commission decision helped facilitate the deployment of UHF technology. *See* Reply Comments of Vulcan Spectrum LLC, *Petition for Rulemaking Regarding the Need for 700 MHz Mobile Equipment to be Capable of Operating on All Paired Commercial 700 MHz Frequency Blocks*, RM-11592 (filed Apr. 30, 2010).

[117] *NPRM* ¶ 1.

marketplace, no industry solution appears to be forthcoming that will enable interoperable A Block deployments within a reasonable time frame.[118] Rather than engage with smaller carriers to facilitate an industry-wide solution, AT&T—the largest holder of Lower B and C Block licenses, and the principal opponent of Lower 700 MHz interoperability—has insisted on carrying out its network deployment with Band Class 17 devices, even going so far as to assert before the Commission that it is "well within [its] rights to operate on Band 17 in the Lower 700 MHz."[119] Additionally, only a few months ago, AT&T stated that it would abandon its plan to acquire the Lower D Block spectrum from Qualcomm if the Commission mandated Lower 700 MHz band interoperability.[120] AT&T's recent disparaging press remarks, baselessly refuting the findings of the Technical Study that Band Class 17 is unnecessary, further evidence AT&T's rigid unwillingness to find an industry solution.[121] Such an uncompromising position is part and parcel with AT&T's conduct since the conclusion of Auction 73,[122] even while it has represented to the

[118] *Id.* ¶ 4 ("[N]o industry-led solution to the lack of interoperability has yet emerged."); *SBA Comments* at 3 ("[Since 2010], no industry solution to the interoperability issue has been achieved."); Ex Parte Letter of Grant Spellmeyer, Executive Director – Federal Affairs & Public Policy, U.S. Cellular, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket Nos. 12-69, 12-4, AU Docket No. 12-25, CC Docket No. 96-45, at 1-2 (May 9, 2012) ("*May 9 U.S. Cellular Ex Parte*") ("[U.S. Cellular] is concerned that there will not be an industry solution forthcoming that will address interoperability in a reasonable time frame to move the LTE ecosystem forward absent regulatory intervention."); Ex Parte Letter from Rebecca Murphy Thompson, General Counsel, Rural Cellular Association, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket Nos. 12-69, 12-4, RM-11592 ("Despite extensive RCA member efforts to deploy on the Lower 700 MHz A Block spectrum, the lack of interoperability in the Lower 700 MHz band remains an intractable problem.").

[119] Ex Parte Letter from Joseph P. Marx, Assistance Vice President, AT&T Services, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, RM-11626, RM-11592 (Feb. 28, 2012).

[120] Ex Parte Letter from Joan Marsh, Vice President – Federal Regulatory, AT&T, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket No. 11-18, at 4 (Dec. 9, 2011).

[121] *See* Marguerite Reardon, *Regional Carriers Call AT&T's Bluff on Spectrum Interference*, CNET (May 30, 2012), *at* http://news.cnet.com/8301-1035_3-57444088-94/regional-carriers-call-at-ts-bluff-on-spectrum-interference/.

[122] *See supra* Section II. Since the Commission released the NPRM on March 21, 2003, AT&T has on three different occasions emphasized to the Commission its unwavering opposition to Lower 700 MHz interoperability. *See* AT&T ex parte filings in WT Docket 12-69.

Commission that "industry-led standards efforts are preferable to regulatory mandates,"[123] and consistent with AT&T's influence over 3GPP in successfully creating Band Class 17 in the first place.[124] In the absence of Commission action, AT&T has no incentive to reverse its course.

The Commission need not look any further than the marketplace to confirm that industry solutions to interoperability in the Lower 700 MHz band do not exist, and are not likely to emerge. As noted above, commercially viable handsets for Lower A Block networks have not emerged, and the few that have suffer from irreparable deficiencies.[125] Despite its recent introduction of such a device, U.S. Cellular continues to implore the Commission to "still act quickly to address issues related to interoperability within the lower 700 MHz bands."[126]

The unlikely prospect for a market-based solution to interoperability is further reflected by Verizon Wireless's recent announcement of its plans to sell its Lower A Block holdings, contingent upon the Commission's approval of Verizon Wireless' proposed acquisition of certain Advanced Wireless Service licenses from the nation's leading cable providers.[127] While Verizon, in responding to the Commission's inquiry regarding the planned A Block spectrum sale, indicated that it has taken steps to deploy mobile service in the A Block, it concedes that it has only "communicated with equipment vendors about procuring both devices and network

[123] Ex Parte Letter from Robert W. Quinn, Jr., Senior Vice President and Chief Privacy Officer, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 12-69 (May 21, 2012).

[124] *See supra* Section II.

[125] *See supra* Section IV.A.

[126] *May 9 U.S. Cellular Ex Parte* at 1.

[127] *See* Letter from Rick Kaplan, Chief, Wireless Telecommunications Bureau, Federal Communications Commission, to John T. Scott, III, Vice President & Deputy General Counsel, Verizon Wireless, WT Docket No. 12-4 (May 15, 2015) ("*WTB Verizon Inquiry Letter*"); Letter from Kathleen Grillo, Senior Vice President – Federal Regulatory Affairs, Verizon Wireless, to Rick Kaplan, Chief, Wireless Telecommunications Bureau, Federal Communications Commission, WT Docket No. 12-4 (May 22, 2012) ("*May 22 Verizon Letter*").

equipment that will operate" on the Lower 700 MHz A Block.[128] Conspicuously absent from Verizon's response is any discussion of whether Verizon has had any success in securing interoperable A Block devices. Notably, Verizon's planned sale follows from its recent transfer of A Block spectrum in Chicago to Leap Wireless—a smaller wireless operator that has long been aligned with Vulcan and other A Block licensees in supporting a Commission mandate for interoperability in the Lower 700 MHz band.[129] Verizon's obvious strong interest in transferring its A Block holdings undermines its representations to the Commission in April 2010, when it manifested an intent to pursue the "design and development of radios and wireless devices that work on . . . Band Class 12."[130] In the interim, Verizon has apparently decided that it would be better served by selling off its Lower A Block holdings. With neither Verizon nor AT&T expressing interest in interoperable Lower 700 MHz equipment, the functioning ecosystem that exists for other bands will not develop in the Lower 700 MHz band, and an industry solution will not emerge. Accordingly, the Commission must take regulatory action to adopt a clear and effective interoperability solution.

D. An Interoperability Requirement Could Be Implemented Quickly at Minimal Cost.

The Commission can establish an interoperability requirement quickly and at minimal cost to consumers, Lower 700 MHz licensees, and device makers. Contrary to AT&T's misleading assertions, Vulcan and other Lower A Block licensees have not requested, and are not asking, the

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[128] *May 22 Verizon Letter* at 3.

[129] *See* Ex Parte Letter from Charles W. Logan, Lawler, Metzger, Keeney & Logan, LLC, Counsel to Connect Public Safety Now, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 06-150, PS Docket No. 06-229, GN Docket No. 09-51, RM-11592 (Dec. 2, 2010). Leap Wireless is a member of the Connect Public Safety Now coalition through its subsidiary, Cricket Communications.

[130] Reply Comments of Verizon Wireless, *700 MHz Mobile Equipment Capability; Petition for Rulemaking Regarding the Need for 700 MHz Mobile Equipment to be Capable of Operating on All Paired Commercial 700 MHz Frequency Blocks*, RM-11592, at 5 (Apr. 30, 2010).

Commission to impose network or device mandates that would limit any carrier's ability to manage its network or meet its customers' needs. Rather, a simple requirement that all devices and equipment capable of operating on any paired spectrum block in the Lower 700 MHz band must be capable of operating on *all* paired spectrum blocks in the Lower 700 MHz band can be adopted with minimal cost, yet yield enormous public interest benefits. The Commission has a number of alternatives for implementing an interoperability requirement, and much of the transition to interoperability can be carried out through regularly scheduled remote software upgrades, without any service disruption, delays, or degradation. In addition to acknowledging that interoperability across the Lower 700 MHz band could have pro-consumer benefits, AT&T has conceded that it is technically capable of migrating to Band Class 12 devices.[131]

1. Options for Implementing an Interoperability Mandate

The Commission's suggested "substitution" approach of mandating the use of Band Class 12, in lieu of Band Class 17, is the most efficient means of promptly achieving interoperability, and offers several advantages.[132] First, such an approach would obviate the need for B and C Block licensees to modify their base stations to support frequencies that they are not authorized to use.[133] As Vulcan has previously explained to the Commission, because AT&T is not changing its operating frequencies, transitioning its base stations to Band Class 12 would require no changes to the base station hardware.[134] Consequently, AT&T would incur no hardware costs associated with

[131] *See, e.g.*, Ex Parte Letter from Joan Marsh, Vice President – Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 07-293, IB Docket No. 11-149, RM-11592 (Feb. 21, 2012).

[132] *NPRM* ¶ 50.

[133] *Id.* ¶ 32 ("[A] transition from Band Class 17 to Band Class 12 does not necessitate a change to base station filtering. Operators deploying networks in the Lower 700 MHz B and C Blocks can continue to filter base station receivers as they would for Band Class 17.").

[134] Ex Parte Letter from Michele Farquhar, Hogan Lovells, Counsel to Vulcan Wireless, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket No. 11-18, RM-11592, Attachment at 2 ("*Dec. 15 Vulcan Ex Parte*").

switching to the unified band class.[135] Rather, AT&T's base stations could accommodate Band Class 12 operation through a modest software upgrade, which can be performed at minimal cost, often without even requiring a technician to visit the affected base stations.[136]

Second, given the lack of interference concerns, effectuating interoperability through a unified Band Class 12 chipset would require only minor modifications to handsets and other mobile equipment currently designed to support only Band Class 17. As Band Class 12 is an existing band with approved technical specifications, new device chipsets would not be necessary to support Lower 700 MHz interoperability.[137] Implementing Band Class 17 devices already include Band Class 12 chipsets, but with software that prevents use of the A Block. In future LTE devices, manufacturers need only replace the Band Class 17 software with Band Class 12 and effectuate a small widening in the duplexer to support the Lower A, B and C Blocks, leaving the device architecture otherwise unchanged.[138] There would be no increase in the number of bands to support, and no new power amplifiers, switches, or filters to incorporate in the device.[139] These device modifications could be implemented within a few months,[140] while legacy Band Class 17 devices could be upgraded to recognize Band Class 12 base stations and channel numbers through a remote software update.[141] As a result of these minor modifications, Lower A Block subscribers using new Band Class 12 devices would be able to receive service throughout the Lower 700 MHz band, while subscribers with legacy Band Class 17 devices would continue to communicate

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[135] *Id.*

[136] *Id.*

[137] *Id.*, Attachment at 1, 3.

[138] *Id.*

[139] *Id.*

[140] *Id.*

[141] *Id.*, Attachment at 2.

through the Band Class 12 infrastructure, although they would continue to be limited to operation on the Lower B and C Blocks.[142]

Finally, to comply with a substitution mandate, a device manufacturer would not be required to use any additional chipset ports to achieve interoperability. Rather than use two unique chipsets—one for Band Class 12 and one for Band Class 17—which largely overlap, the device need only support one chipset port (*i.e.*, Band Class 12). This in turn leaves open the opportunity for the device to support alternative spectrum bands on the remaining chipset ports. Moreover, this approach would have no impact whatsoever on existing devices that use Band Class 17, which will continue to operate on the B and C Blocks. The costs of this substitution approach, relative to its attendant benefits, are minimal. Even if a carrier chooses to continue supporting Band Class 17 for its existing legacy LTE devices, the complete overlap in frequencies between the Band Class 12 and Band Class 17, together with currently available network management technologies, will enable the carrier to accommodate both sets of devices.[143]

Although the substitution approach may be the most efficient method by which the Commission can achieve interoperability in the Lower 700 MHz band, it is not the only means of doing so. Alternatively, the Commission could adopt a "federated" approach, by allowing a carrier to simply add Band Class 12 chipset components into a mobile device, together with the Band Class 17 components. While such an approach would yield interoperable devices, it may limit the number of frequency bands that a 4G device can support. For example, Qualcomm has indicated that its chipsets can support up to five frequency bands—two below 1 GHz, and three

[142] *See infra* Section V.D.2.

[143] *NPRM* ¶ 41.

above 1 GHz.[144] Consequently, absent additional technological improvements or the incorporation of external switches, if a device employs both Band Class 12 and Band Class 17, it would be unable to support another low-frequency band for cellular use.[145] Relative to the limited costs of requiring devices to substitute Band Class 12 for Band Class 17, this federated approach may be suboptimal.[146]

2. Grandfathered Band Class 17 Devices

Regardless of the manner in which the Commission mandates Lower 700 MHz interoperability, Vulcan supports the Commission's proposal to grandfather Band Class 17 devices already in use by consumers as of the transition deadline.[147] Although such legacy devices will have no ability to roam on Lower A Block networks, allowing their continued operation after the transition to full interoperability in the Lower 700 MHz band is an appropriate way to reduce the cost to consumers. However, as described above, the Commission should take prompt action in this proceeding to ensure that the universe of Band Class 17 devices in the marketplace remains as small as possible, if only to preserve the options available to the Commission in devising a plan for implementing Lower 700 MHz interoperability.[148]

3. Implementation Timeline

While Vulcan strongly urges the Commission to adopt an interoperability mandate to reconsolidate the Lower A, B, and C Blocks before the end of 2012, Vulcan agrees that a

[144] *See* Ex Parte Letter from Dean Brenner, Vice President – Government Affairs, Qualcomm Incorporated, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket No. 11-18, RM-11592, Attachment 1 at 3 (Apr. 27, 2011).

[145] *Dec. 15 Vulcan Ex Parte*, Attachment at 3.

[146] The Commission could also achieve interoperability through an "integrated" approach, by permitting carriers to offer and support devices with a single chipset that integrates Band Class 12 and Band Class 17. While such an approach would also be effective, it would require device manufacturers to develop viable chipsets that adequately combine both band classes. Additionally, this approach may impact the size of 4G devices, and would not capture the cost efficiencies of a substitution approach.

[147] *NPRM* ¶ 50.

[148] *See supra* Section V.E.3.

reasonable transition period for full interoperability is appropriate. Vulcan has consistently urged the Commission to provide AT&T with a sufficient amount of time to comply with an obligation requiring interoperability across the Lower 700 MHz band.[149] However, given the rapidly approaching coverage and service deadlines that A Block licensees must meet, a two year transition period, without any interim interoperability-related requirements, will be inadequate to alleviate the competitive harms that already exist in the marketplace. Accordingly, Vulcan urges the Commission to adopt a timeline that includes the following transition milestones:

Months After Interoperability Decision	Milestone
6 months	***Base Station Transition*** – All carriers must upgrade their base stations to support interoperability across the entire Lower 700 MHz band.
9 months	***Interim Device Transition*** – Any carrier that offers at least one mobile device that is capable of operating on any paired spectrum block within the Lower 700 MHz band must commercially offer and support, in each market in which the carrier offers service to any person or entity, at least one mobile device that is capable of operating across all paired spectrum blocks in the Lower 700 MHz band.
18 months	***Full Transition*** – All carriers must ensure that each device that is capable of operating in any paired spectrum block within the Lower 700 MHz band, which the carrier offers to any person or entity in any market, is capable of operating across all paired spectrum blocks in the Lower 700 MHz band.

The timeline proposed above is imminently reasonable and feasible. The transition costs associated with substituting Band Class 12 for Band Class 17 will be minimal, and will largely necessitate routine software upgrades and modest, inexpensive changes to future LTE devices. As such, the Commission's concern for "stranded investments in existing equipment" should not play

[149] *See, e.g.*, Ex Parte Letter from Michele Farquhar, Hogan Lovells, Counsel to Verizon Wireless, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket No. 11-18, RM-11592, at 2 (Dec. 12, 2011).

a material role in devising transition timeline.[150] Indeed, with few changes, the infrastructure that has been deployed to support Band Class 17 devices will be able to continue supporting Band Class 12 devices. By adopting the implementation schedule described above, the Commission can appropriately facilitate the prompt introduction of devices capable of operating across the Lower 700 MHz band, while giving due consideration to the risk, however small, of stranded investment in existing next-generation wireless equipment.

E. The Commission Should Adopt an Interoperability Solution Before the End of 2012.

Vulcan urges the Commission to mandate interoperability in the Lower 700 MHz band, and adopt a schedule that establishes a firm timeline for the implementation of interoperability by the end of 2012.[151] In addition to promoting competition and facilitating investment, innovation, and job creation, an interoperability requirement before the end of 2012 will serve the public interest by (i) creating certainty for A Block licensees as they deploy their networks and potentially seek Mobility Fund proceeds for which they may be eligible, (ii) helping to alleviate the spectrum crunch caused by the intense demand for wireless spectrum, (iii) preserving the Commission's options for implementing interoperability requirements, and (iv) abating the economic harm that has resulted from delayed service in the A Block.

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[150] *NPRM* ¶ 50.

[151] *NPRM* ¶ 48; *March 12 Vulcan Ex Parte* at 1; Ex Parte Letter from Michele Farquhar, Hogan Lovells, Counsel to Vulcan Wireless, to Marlene Dortch, Secretary, Federal Communications Commission, WT Docket No. 11-18, RM-11592 (urging the Commission to expeditiously address the interoperability concerns in the Lower 700 MHz band); *May 9 U.S. Cellular Ex Parte* at 2 ("[T]he Commission must still act quickly to promote interoperability within the lower 700 MHz bands."); Ex Parte Letter from Rebecca Murphy Thompson, General Counsel, RCA, to Marlene H. Dortch, Secretary, Federal Communications Commission (Jan.19, 2012) (explaining that interoperability "must be implemented before the end of 2012 if competitive carriers are to remain viable").

1. Certainty for A Block Licensees

The Commission's prompt decision to mandate interoperability in the Lower 700 MHz band will help provide the certainty that A Block licensees require to meet their looming build-out and service obligations. Under Section 27.14(g) of the Commission's rules, absent an extension or waiver from the Commission, A Block licensees must provide signal coverage and offer service over at least 35 percent of their licensed geographic service areas by June 13, 2013, and must provide service over at least 70 percent of their geographic service areas by the end of the A Block license term.[152] As long as the Lower 700 MHz band remains fragmented, A Block licensees will continue to face crippling uncertainty concerning their ability to deploy and offer viable service in the near- and long-term. Such uncertainty will persist even if the Commission is able to resolve the interference-related problems raised by Channel 51 TV operations in some of the A Block licensees' markets and high powered E Block transmissions. As the interim coverage and service deadline approaches, it is imperative that A Block licensees, including greenfield operators like Vulcan, have reasonable access to affordable devices and equipment that meet actual consumer demand and have reasonable options to deploy against various business models. The Commission's prompt decision to reconsolidate the Lower A, B, and C Blocks will facilitate such access.

Likewise, a quick resolution to this proceeding will help provide the certainty necessary for A Block licensees to effectively apply and compete for Phase II Mobility Fund support. Although it is likely too late for A Block licensees to obtain the certainty necessary for them to effectively compete in the reverse auction for Phase 1 of the Mobility Fund, which is scheduled to

[152] 47 C.F.R. § 27.14(g).

begin on September 27, 2012,[153] an interoperability mandate could facilitate their ability to compete in Phase II of the Mobility Fund, which will be implemented sometime in 2013.[154] To effectively participate in the reverse auctions for such support, carriers must have a reasonable understanding of their future business prospects. However, without the security of knowing that interoperable equipment in the Lower 700 MHz band will be available in the near future, A Block licensees will have no ability to predict their future service capabilities or network coverage, and will be effectively precluded from participating in the Mobility Fund auctions. As incumbent Lower B and C Block licensees suffer no such uncertainty, A Block spectrum holders will face an inherent disadvantage in competing for Mobility Fund proceeds absent regulatory relief. Such a result is clearly contrary to the public interest.

2. Partial Alleviation of the Spectrum Crunch

An interoperability requirement in the Lower 700 MHz band will also help unleash a substantial amount of valuable spectrum for competitive wireless service. The Lower A Block offers 12 MHz of nationwide spectrum that is perfectly suited for mobile broadband service. Given the unprecedented growth in demand for spectrum—led by the rapid adoption of smartphones, tablets, and other mobile broadband devices—facilitating the prompt deployment of

[153] Connect America Fund, WC Docket No. 10-90, A National Broadband Plan for Our Future, GN Docket No. 09-51, Establishing Just and Reasonable Rates for Local Exchange Carriers, WC Docket No. 07-135, High-Cost Universal Service Support, WC Docket No. 05-337, Developing an Unified Intercarrier Compensation Regime, CC Docket No. 01-92, Federal-State Joint Board on Universal Service, CC Docket No. 96-45, Lifeline and Link-Up, WC Docket No. 03-109, Universal Service Reform – Mobility Fund, WT Docket No. 10-208, *Report and Order and Further Notice of Proposed Rulemaking*, FCC 11-161, 26 FCC Rcd 17663 (2011) ("*CAF Order*"); Mobility Fund Phase I Auction Scheduled for September 27, 2012; Notice and Filing Requirements and Other Procedures for Auction 901, *Public Notice*, AU Docket No. 12-25, DA 12-641 ¶¶ 1-2 (May 2, 2012).

[154] *CAF Order* ¶ 9.

wireless spectrum should be a top priority for the Commission.[155] This proceeding presents the Commission with an ideal opportunity to take such an action.

3. Preservation of the Commission's Available Options for Implementing an Interoperability Requirement

The Commission should also quickly resolve this proceeding to ensure that all of its options for implementing an interoperability mandate remain feasible and available. As discussed further below, the Commission now has at its disposal several reasonable ways of implementing an interoperability requirement quickly and at minimal cost.[156] However, the viability of some of these options will diminish as additional generations of non-interoperable devices are introduced to the marketplace. AT&T's current practice of offering subscribers Band Class 17 devices throughout the country not only harms A Block licensees by entrenching a growing subscriber base with handsets that will never be able to operate in an A Block network,[157] but will also increasingly confine the Commission's ability to craft an effective means of implementing Lower 700 MHz interoperability. By acting promptly to resolve this proceeding, the Commission will preserve the options available to it in achieving interoperability as a practical matter.

4. Abatement of Economic Harm Caused by Lack of Lower 700 MHz Interoperability

A prompt decision to mandate interoperability in the Lower 700 MHz band will also allow A Block licensees to harness value from their substantial investment in A Block licenses, and mitigate the myriad economic harms that have resulted from the A Block licensees' inability to deploy service in their licensed territories. As noted above, the auction for Lower A Block spectrum garnered approximately $3.96 billion in proceeds, nearly $1.4 billion of which was from

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[155] *See* Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands, *Notice of Proposed Rulemaking and Notice of Inquiry*, WT Docket No. 12-70, FCC 12-32 ¶¶ 10-12 (rel. Mar. 21, 2012).

[156] *See infra* Section V.D.

[157] *See supra* Section IV.E.

small, regional, or greenfield providers.[158] Vulcan acquired its A Block licenses in Auction 73 for approximately $113 million, the sixth highest amount spent on A Block licenses and the tenth highest amount spent among all Auction 73 bidders. Although most bidders, including Vulcan, knew at the time of Auction 73 that the Lower A Block spectrum possessed distinct attributes because of nearby and adjacent channel operations, they could not have known or predicted that the mobile standards process would be commandeered to secure a disaggregated band plan for the Lower 700 MHz band. In one fell swoop, the creation of Band Class 17 wiped out billions of dollars of economic value, and has resulted in an untold number of man hours devoted to resolving the A Block deployment obstacles created by a disjointed Lower 700 MHz band. Evidence of the diminished value of the Lower A Block spectrum since the close of Auction 73 can be found in Verizon Wireless's recent announcement of its intent to sell its remaining Lower A Block spectrum (conditioned on approval of its acquisition of certain AWS spectrum), as well as its recent transfer of its A Block license in Chicago to Leap Wireless.[159]

The economic harm created by non-interoperability in the Lower 700 MHz band is not limited to the market or auction value of the A Block licenses. As noted above, as the economic value created by Commission auctions is approximately ten times the financial proceeds yielded at auction, the economic harm caused by non-interoperability compounds with each passing day, contrary to the public interest. To stop the proverbial bleeding, the Commission must act quickly to achieve interoperability in the Lower 700 MHz band.

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[158] *See supra* Section IV.B.

[159] Moreover, as noted above, Verizon never integrated Band Class 12 into its LTE deployment plans, even though it was the largest Lower A Block licensee. *See supra* n.34 and accompanying text.

VI. CONCLUSION

For the reasons stated herein, Vulcan urges the Commission to take prompt action to develop an interoperability mandate for the Lower 700 MHz band before the end of 2012, and looks forward to the opportunity to assist the Commission in its efforts to develop and implement such a requirement in the near future.

Respectfully submitted,

/s/ Michele C. Farquhar

Michele C. Farquhar
Christopher J. Termini

Hogan Lovells US LLP
555 Thirteenth Street, NW
Washington, DC 20004
Tel: (202) 637-5663
Fax: (202) 637-5910

June 1, 2012

Attorneys for Vulcan Wireless LLC